

HP 13220

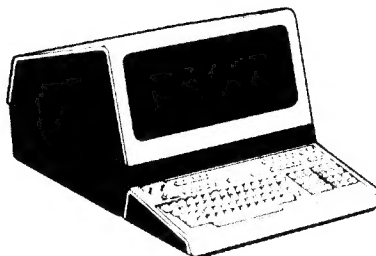
KEYBOARD MODULE

Manual Part Number 13220-91001

Revised

JAN-15-80

# ***DATA TERMINAL*** **TECHNICAL INFORMATION**



HEWLETT  PACKARD

HP 13220

KEYBOARD MODULE

Manual Part Number 13220-91001

Revised

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NOTICE

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NOTE: This document is part of the 262XX DATA TERMINAL product series Technical Information Package (HP 13220).

## 1.0 INTRODUCTION.

The Keyboard Module scans the keys and returns their status to the Processor PCA. It also carries the "Bell" loudspeaker.

## 2.0 OPERATING PARAMETERS.

A summary of operating parameters for the Keyboard Module is contained in tables 1.0 through 4.0.

Table 1.0 Physical Parameters

Part Number	Nomenclature	Size (L x W x D) +/-2.5mm	Weight kgs
02620-60001	Keyboard PCA	325 x 150 x 50	0.7
02620-60070	Intl Kybd PCA	325 x 150 x 50	0.7

Table 2.0 Reliability and Environmental Information

Environmental: ( x ) HP Class B ( ) Other:
Restrictions: Type tested at product level
Failure rate: 1.33620 (percent per 1000 hours )

Table 3.0 Power Supply Requirements

=====		=====
	+5V to +12V at 100mA max	
	A resistor on the Processor PCA controls the bell current to	
	100 mA. The CMOS and associated circuits draw less than 10mA	
=====		=====

Table 4.0 Connector Information

=====			=====
	Connector	Signal	Description
	and Pin No	Name	
	=====	=====	=====
	J1-1	Keya1	Key address 1
	J1-2	Keya2	Key address 2
	J1-3	Keya3	Key address 3
	J1-4	Keya4	Key address 4
	J1-5	Keya5	Key address 5
	J1-6	Keya6	Key address 6
	J1-7	Keya7	Key address 7
	J1-8		Not used
	J1-9	Keyactn	Response line low if addressed
			key is pressed
	J1-10	Ground	
	J1-11	Bell	Drive for bell
	J1-12	Positive	Vcc
	Spade Lug	Shield	
	=====	=====	=====

### 3.0 FUNCTIONAL DESCRIPTION.

Refer to the block diagram (figure 1), schematic diagram (figure 2), timing diagram (figure 3), component location diagram (figure 4), and parts list (02620-60001), located in the appendix.

The keyboard scanning system comprises a CMOS BCD to decimal decoder, which addresses the columns of the key switch array, and a 1-of-8 multiplexer which scans the rows. These rows and columns do not refer to physical placement of the keys.

#### 3.1 KEYSWITCH ARRAY.

Each keyswitch has the cathode of a diode attached to it. The anode of each diode connects to the 1-of-10 decoder line corresponding to that column. The diodes are to prevent "phantom" keys when several adjacent keys are pressed.

#### 3.2 COLUMN DRIVE.

An address presented to the 1-of-10 decoder raises one line to a higher voltage.

#### 3.3 ROW SCANNER.

An address presented to the 1-of-8 multiplexer selects one of the rows, and passes its state to a transistor pair which drive the response line. The rows are usually pulled low by resistors, but when a key is depressed, the row takes on the voltage state of the column connected to that key. The transistors turn on only when a key selected by both the row and column elements is pressed.

#### 3.4 INPUT PROTECTION.

The addresses are sent from the Processor PCA through cable 02620-60028 to J1-1,-7, passed through resistor/capacitor pairs R1-7, C1-7, (Input Protection to reduce the effect of transients), to U1 and U3, the column driver and row scanner.

The transistors also have resistors and capacitors to reduce the effect of spurious switching transients as well as to supply bias current.

### 3.5 RESPONSE DRIVER.

J1-9 provides the path (through the cable) to the Processor PCA for sensing the key state.

J1-10 and J1-12 are the positive and negative supplies.

### 3.5 BELL SPEAKER.

J1-11 connects to the "bell" speaker. The associated diode is to allow the current stored in the inductance of the speaker coil to be shunted when the drive is removed.

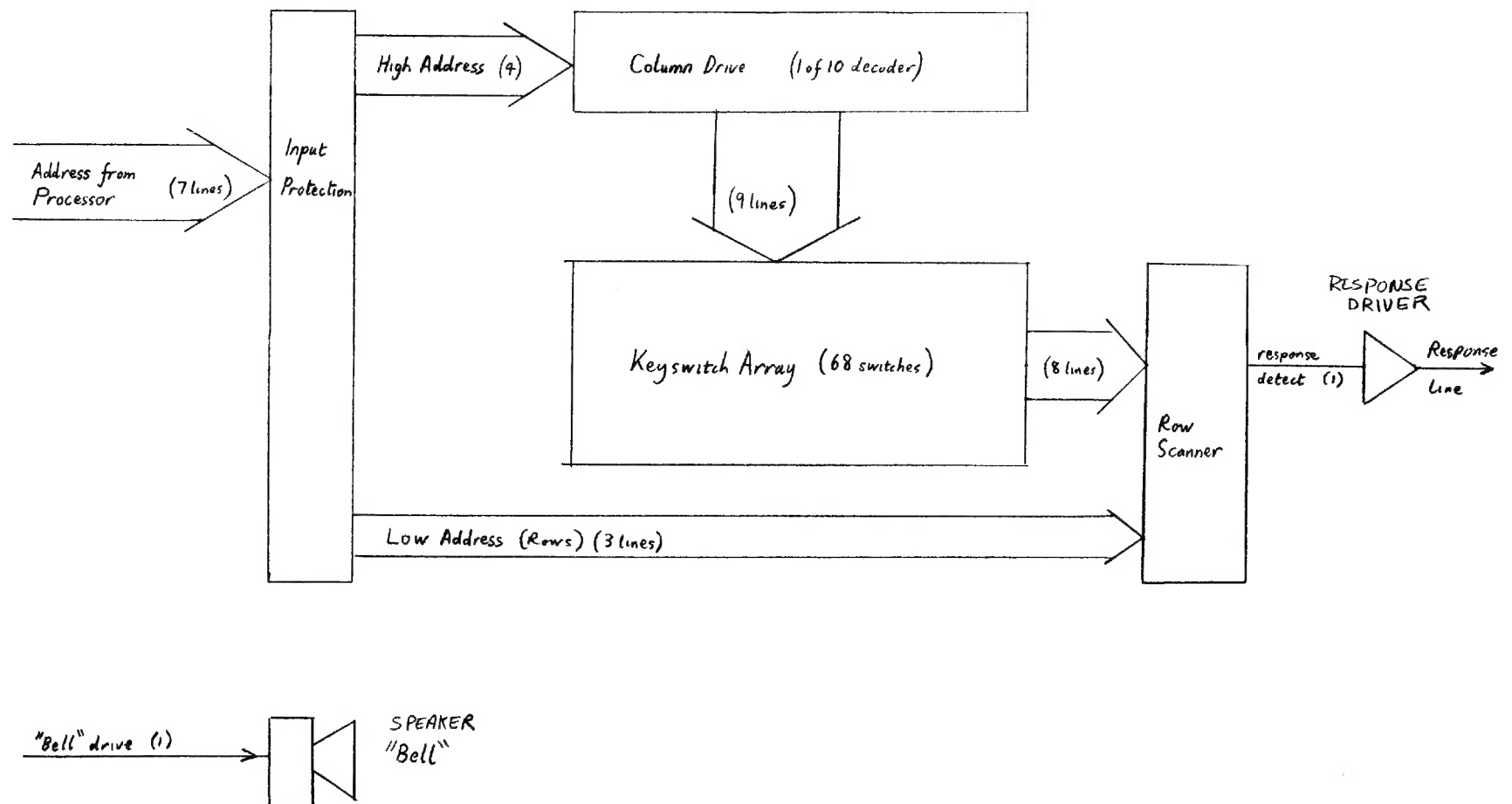
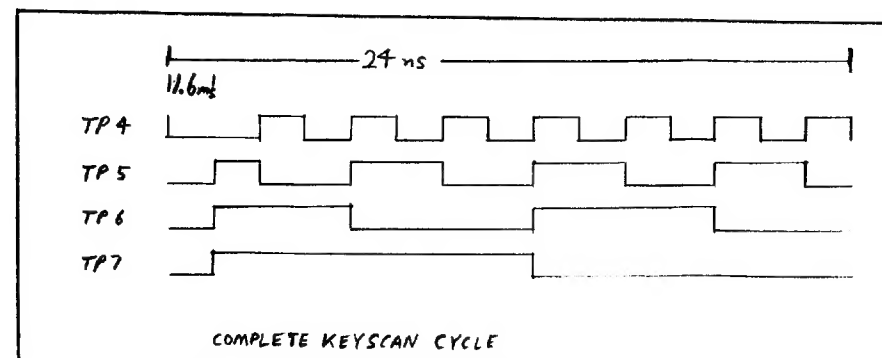
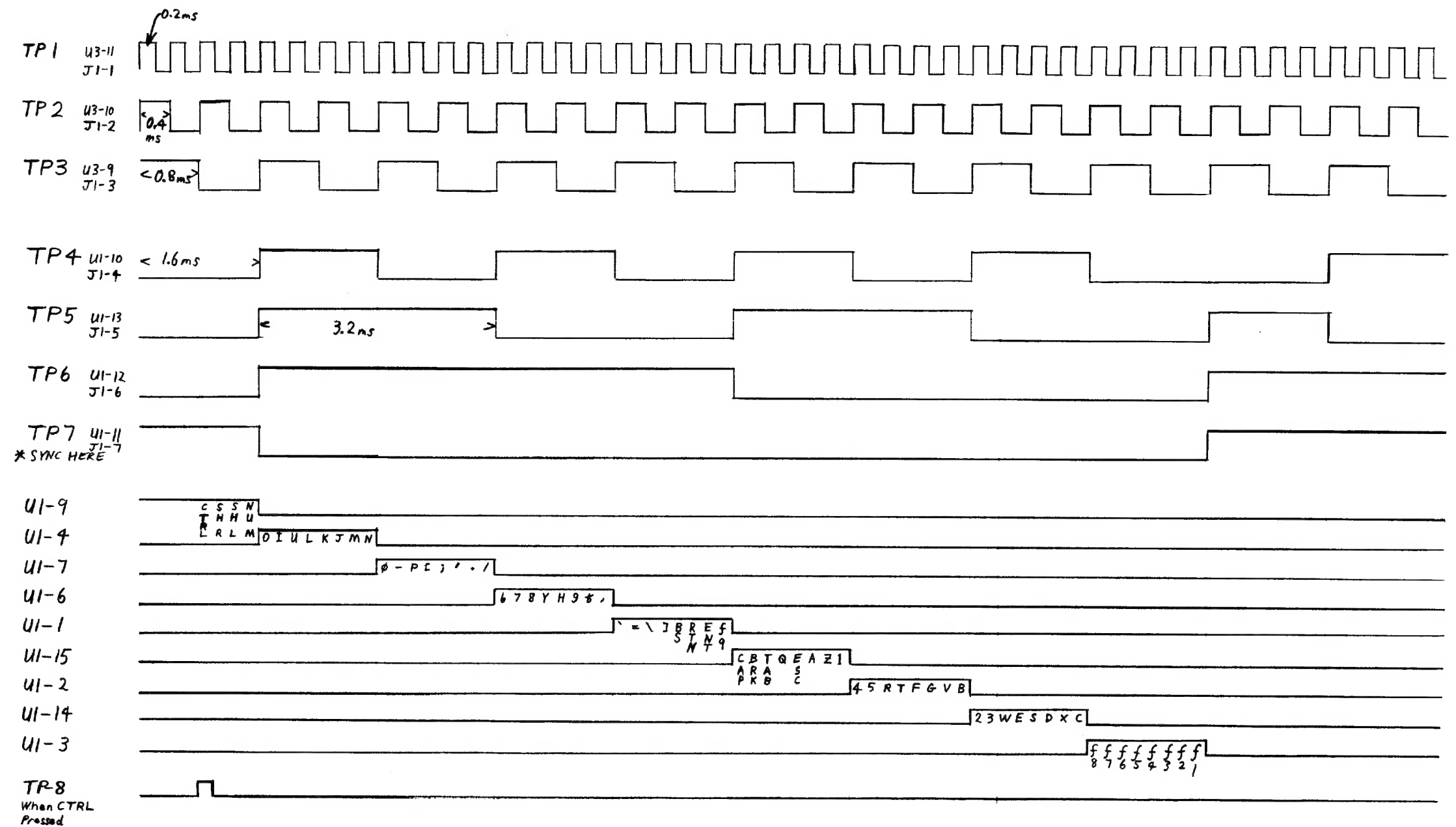


Figure 1  
Keyboard Module Block Diagram  
DEC-05-78 13220-91001







ALL "HIGH'S" APPROX 5V  
ALL "LOW'S" APPROX 0V

Figure 3  
Keyboard Timing Diagram  
DEC-05-78 13220-91001

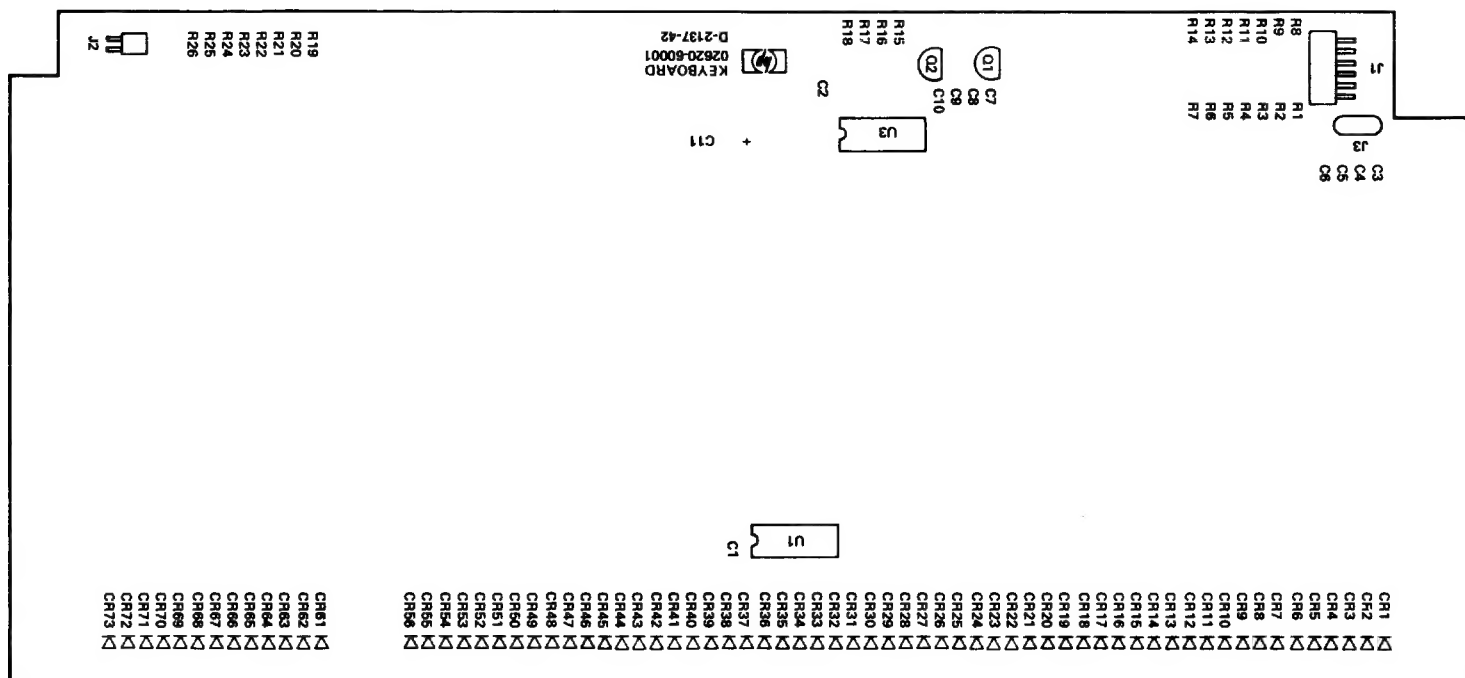


Figure 4  
Keyboard Location Diagram  
JAN-15-80 13220-91001

## 02620-60001 Keyboard PCA

DATE CODE: D-2137-42

C3-C10	CAP 470PF 10%	0160-3335	7.00 EA
C1,C2	CAP .1UF 20% 50V	0160-4557	2.00 EA
C11	CAP 22 UF 25V	0180-2879	1.00 EA
	ETCHED BOARD	02620-80001	1.00 EA
	KEYCAP A COC BRN	0371-1219	1.00 EA
	KEYCAP B COC BRN	0371-1220	1.00 EA
	KEYCAP C COC BRN	0371-1221	1.00 EA
	KEYCAP D COC BRN	0371-1222	1.00 EA
	KEYCAP E COC BRN	0371-1223	1.00 EA
	KEYCAP F COC BRN	0371-1224	1.00 EA
	KEYCAP G COC BRN	0371-1225	1.00 EA
	KEYCAP H COC BRN	0371-1226	1.00 EA
	KEYCAP I5 COC BR	0371-1227	1.00 EA
	KEYCAP J1 COC BR	0371-1228	1.00 EA
	KEYCAP K2 COC BR	0371-1229	1.00 EA
	KEYCAP L3 COC BR	0371-1230	1.00 EA
	KEYCAP MO COC BR	0371-1231	1.00 EA
	KEYCAP N COC BRN	0371-1232	1.00 EA
	KEYCAP O6 COC BR	0371-1233	1.00 EA
	KEYCAP P COC BRN	0371-1234	1.00 EA
	KEYCAP Q COC BRN	0371-1235	1.00 EA
	KEYCAP R COC BRN	0371-1236	1.00 EA
	KEYCAP T COC BRN	0371-1238	1.00 EA
	KEYCAP U4 COC BR	0371-1239	1.00 EA
	KEYCAP V COC BRN	0371-1240	1.00 EA
	KEYCAP W COC BRN	0371-1241	1.00 EA
	KEYCAP X COC BRN	0371-1242	1.00 EA
	KEYCAP Y COC BRN	0371-1243	1.00 EA
	KEYCAP Z COC BRN	0371-1244	1.00 EA
	KEYCAP 1! COC BR	0371-1245	1.00 EA
	KEYCAP 2@ COC BR	0371-1246	1.00 EA
	KEYCAP 3# COC BR	0371-1247	1.00 EA
	KEYCAP 4\$ COC BR	0371-1248	1.00 EA
	KEYCAP 5% COC BR	0371-1249	1.00 EA
	CAP 6 CAROT CBR	0371-1250	1.00 EA
	KEYCAP 7& COC BR	0371-1251	1.00 EA
	KEYCAP 8* COC BR	0371-1252	1.00 EA
	KEYCAP 9( COC BR	0371-1253	1.00 EA
	KEYCAP 0) COC BR	0371-1254	1.00 EA
	CAP UDLINE CBR	0371-1255	1.00 EA
	KEYCAP =+ COC BR	0371-1256	1.00 EA
	CAP TILDE-GRV	0371-1257	1.00 EA
	CAP LT BKTPAR CB	0371-1258	1.00 EA
	CAP RT BKTPAR CB	0371-1259	1.00 EA
	CAP BKSLH BAR CB	0371-1260	1.00 EA
	KEYCAP ;: COC BR	0371-1261	1.00 EA
	KEYCAP '" COC BR	0371-1262	1.00 EA
	KEYCAP ,< COC BR	0371-1263	1.00 EA
	KEYCAP .> COC BR	0371-1264	1.00 EA
	KEYCAP /? COC BR	0371-1265	1.00 EA

	CAP ESC DEL CBRN	0371-1266	1.00 EA
	CAP BACKSPC CBRN	0371-1267	1.00 EA
	CAP CAPS CO BRN	0371-1268	1.00 EA
	CAP CTRL COC BRN	0371-1269	1.00 EA
	CAP ENTER COC BR	0371-1270	1.00 EA
	CAP NUM COC BRN	0371-1271	1.00 EA
	CAP BREAK CO BRN	0371-1272	1.00 EA
	CAP TAB/BKTB CBR	0371-1273	1.00 EA
	CAP SHIFT CO BRN	0371-1274	2.00 EA
	CAP(BLANK) ADBRN	0371-1276	1.00 EA
	KEYCAP RETURN	0371-2367	1.00 EA
	SCR-TPG 4-20	0624-0324	9.00 EA
R8-R18	RES 10K 5% .25	0683-1035	1.00 EA
R19-R26	RES 220K 5% .25	0683-2245	8.00 EA
R1-R7	RES 4.7K 5% .25	0683-4725	7.00 EA
J2	CONN 2 PIN M	1251-5545	1.00 EA
J1	CONN 11 PIN M	1251-5551	1.00 EA
J3	TERMINAL-PCB TAB	1251-5613	1.00 EA
U3	IC CD4051BE	1820-1315	1.00 EA
U1	IC MC14028BCP	1820-1962	1.00 EA
Q1,Q2	XSTR 2N4401 PL5	1854-0832	2.00 EA
CR1-CR56	DIODE SIL	1901-0040	9.00 EA
CR61-CR73			
	SWITCH ARY 4X1LT	3101-2448	1.00 EA
	SWITCH ARY 4X1RT	3101-2449	1.00 EA
	KYSW SUB-ASSY	3101-2554	1.00 EA

## 02620-60070 International Keyboard

DATE CODE: D-2137-42

C3-C10	CAP 470PF 10%	0160-3335	7.00	EA
C1,C2	CAP .1UF 20% 50V	0160-4557	2.0	EA
	CAP 22 UF 25V	0180-2879	1.00	EA
	ETCHED BOARD	02620-80001	1.00	EA
	KEYCAP B COC BRN	0371-1220	1.00	EA
	KEYCAP C COC BRN	0371-1221	1.00	EA
	KEYCAP D COC BRN	0371-1222	1.00	EA
	KEYCAP E COC BRN	0371-1223	1.00	EA
	KEYCAP F COC BRN	0371-1224	1.00	EA
	KEYCAP G COC BRN	0371-1225	1.00	EA
	KEYCAP H COC BRN	0371-1226	1.00	EA
	KEYCAP I5 COC BR	0371-1227	1.00	EA
	KEYCAP J1 COC BR	0371-1228	1.00	EA
	KEYCAP K2 COC BR	0371-1229	1.00	EA
	KEYCAP L3 COC BR	0371-1230	1.00	EA
	KEYCAP M0 COC BR	0371-1231	1.00	EA
	KEYCAP N COC BRN	0371-1232	1.00	EA
	KEYCAP O6 COC BR	0371-1233	1.00	EA
	KEYCAP P COC BRN	0371-1234	1.00	EA
	KEYCAP R COC BRN	0371-1236	1.00	EA
	KEYCAP S COC BRN	0371-1237	1.00	EA
	KEYCAP T COC BRN	0371-1238	1.00	EA
	KEYCAP U4 COC BR	0371-1239	1.00	EA
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	KEYCAP 4\$ COC BR	0371-1248	1.00	EA
	KEYCAP 5% COC BR	0371-1249	1.00	EA
	CAP UDLINE CBR	0371-1255	1.00	EA
	CAP ESC DEL CBRN	0371-1266	1.00	EA
	CAP BACKSPC CBRN	0371-1267	1.00	EA
	CAP CAPS CO BRN	0371-1268	1.00	EA
	CAP CTRL COC BRN	0371-1269	1.00	EA
	CAP ENTER COC BR	0371-1270	1.00	EA
	CAP NUM COC BRN	0371-1271	1.00	EA
	CAP BREAK CO BRN	0371-1272	1.00	EA
	CAP TAB/BKTB CBR	0371-1273	1.00	EA
	CAP SHIFT CO BRN	0371-1274	2.00	EA
	CAP(BLANK) ADBRN	0371-1276	1.00	EA
	KCAP 2 " SQPGBRN	0371-1864	1.00	EA
	KCAP 8 ( SQPGBRN	0371-1865	1.00	EA
	KCAP 9 ) SQPGBRN	0371-1866	1.00	EA
	KCAP 0 = SQPGBRN	0371-1867	1.00	EA
	KCAP , ; SQPGBRN	0371-1868	1.00	EA
	KCAP . : SQPGBRN	0371-1869	1.00	EA
	KCAP < > SQPGBRN	0371-1874	1.00	EA
	KEYCAP RETURN	0371-2367	1.00	EA
	SCR-TPG 4-20	0624-0324	9.00	EA

R8-R15	RES 10K 5% .25	0683-1035	1.00 EA
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J2	CONN 2 PIN M	1251-5545	1.00 EA
J1	CONN 11 PIN M	1251-5551	1.00 EA
J3	TERMINAL-PCB TAB	1251-5613	1.00 EA
U3	IC CD4051BE	1820-1315	1.00 EA
U1	IC MC14028BCP	1820-1962	1.00 EA
Q1,Q2	XSTR 2N4401 PL5	1854-0832	2.00 EA
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